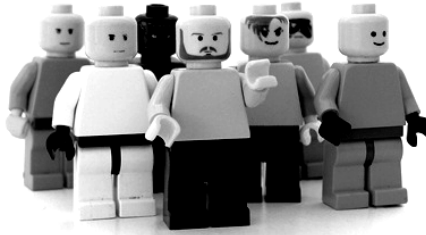
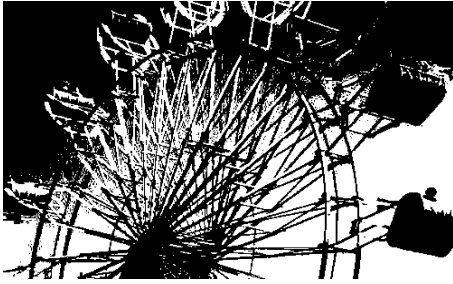


Little man



THRILL RIDE

STRUCTURES and FORCES – Unit PROJECT

(This was modified from the Reverse Bungee Drop of Doom project on page 344 of ScienceFocus 7)

CHALLENGE

You are in a competition to design and develop a prototype model of a new ride for a travelling carnival. The prototype, like the final ride, must appear exciting and be as visually appealing as possible, while keeping your passengers completely safe from harm. Your structure's final mass will also be considered in the competition. The mass will be directly related to the cost for the carnival to move the ride from city to city. Finally, you must consider the cost to construct your ride, as this could determine whether it is affordable and realistic. Good luck!

SPECIFICATIONS for THRILL RIDE PROTOTYPE MODEL

- The structure must be free standing. (i.e. It cannot be attached to the desk, the wall or anything else)
- The structure must be smaller than 1 meter cubed (i.e. 1m long x 1m wide x 1m high)
- The ride must carry two Lego figurines that will represent the humans riding. The figurines can slide, roll or move freely on the ride, provided they do not experience high impacts or forces that could compromise their safety.
- If the Lego figurines are placed in a compartment or car, they must be securely fastened in a way that they can easily enter and exit the ride in a reasonable amount of time (note: if passengers must be taped or glued in, it is impractical and marks will be deducted)
- If water is used, the figurine's head cannot sink below the surface of the water or they will be considered drowned. (note: you may use floatation devices to prevent this)
- Commercial construction kits (e.g. Lego, K'nex etc) can only be used to construct 25% of the ride. The remainder of the ride should use light weight and inexpensive materials and joints (e.g. ties, bolts, adhesives, etc.) to construct a stable structure
- Your ride must have a place where passengers line up and get on the ride.
- You may apply one force to get the passengers in position to ride (e.g. carry them up a ladder to the top of a slide), and one force to start the ride (e.g. a push down the slide, raising a swing up and releasing it, etc.)
- Electronics and small motors may be used (but are not necessary) to enhance the ride

SPECIFICATIONS for SCIENTIFIC DIAGRAM (8.5 x 11" page)

- Your thrill ride must be illustrated or photographed and labeled appropriately (See Scientific Diagram notes and examples from September)
- You must have a title for your ride, and your full name, class and date written on the top right of the page
- Label the following:
 - o Ride components: indicate the materials used and the parts of the ride
 - o Joints: indicate whether they are rigid or mobile joints, and the type of joints used (e.g. fasteners, staples, nails, interlocking shapes, Velcro, lego, ties, adhesives, welded joints). If multiple joints are used, a "number and key" method may be used (this will be covered in class).
 - o Internal forces: indicate with arrows areas of the structure that are placed under internal stress during the operation of the ride (see p.307)
 - o Centre of gravity: draw a small circle on the centre of gravity of your structure (see p.331-333)
- You must indicate the scale of your ride. Use a ratio to show the size of your model compared to the actual ride (e.g. If my roller coaster model is 500 times smaller than the actual ride would be when built, I would write my ratio as 1:500)

SPECIFICATIONS for WRITE UP (1 page)

- **Title:** Your ride must have an enticing and descriptive title. Please be imaginative and appropriate.
- **Ride Description:** Please explain how your ride operates, what the experience is like for the rider, what makes it so thrilling and what risks (if any) does this ride pose. If you are applying a force to the ride in order to make it function, explain how that will be accomplished when the actual ride is built.
- **Cost Analysis:** please indicate the approximate cost of all the actual materials used in building your prototype model. *A bonus of 3 marks are available if your ride is built completely from recycled materials.*

EVALUATION CRITERIA

1. THRILL RIDE MODEL (Out of 12)
 - Aesthetics /2 (2= excellent, 1= satisfactory, 0= unappealing)
 - Stability /2 (2= extremely stable, 1= satisfactory, 0= unstable)
 - Specifications /2 (2=meets all specs, 1=meets most specs, 0=not meeting specifications)
 - Trials /6 (2 marks for each successful trials, 3 trials total)
2. SCIENTIFIC DIAGRAM (Out of 8)
 - Title of the ride /1
 - Illustration or photo of thrill ride structure /2
 - Labels (components of the ride, joints, centre of gravity, and areas of the structure that are placed under internal stresses (i.e. compression, tension, torsion, shear or bending)) /4
 - Scale /1
3. WRITE UP(Out of 7)
 - Title of ride /1
 - Ride Description /3 (3=meets all specs, 2=meets most, 1=meets some, 0=not meeting specifications)
 - Mass /2 (For a ride mass of 10+kg = 0, 5-10kg = 1, 0-10kg = 2.)
 - Cost /2 (A list of materials used and the total cost of the project, \$20+ = 0, \$10-20=1, \$0-10=2)

TOTAL out of 27 (Bonus 3 marks for recycled materials)